

CLAIMS

What is claimed is:

- 5 1. A moveable assembly, comprising:
- a bottom portion;
- a moveable top portion opposing the bottom portion; and
- an electromagnetic assembly, a portion of the electromagnetic assembly being
- integrated with the top portion and another portion of the electromagnetic assembly
- 10 being integrated with the bottom portion in order to produce a vibratory motion in at
- least the top portion.
2. A moveable assembly as in claim 1, further comprising a spring assembly situated at
- least partly on the periphery of the electromagnetic assembly.
- 15 3. A moveable assembly as in claim 1, wherein the top portion is additionally supported
- at least partially by the bottom portion.
4. A moveable assembly as in claim 3, wherein the spring assembly at least partially
- 20 supports the top portion with respect to the bottom portion.
5. A moveable assembly as in claim 1, wherein the electromagnetic assembly comprises
- at least one coil portion and at least one magnetic portion.

6. A moveable assembly as in claim 5, wherein the coil portion is operatively attached to the top portion and wherein the magnetic portion is operatively attached to the bottom portion.

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7. A moveable assembly as in claim 5, wherein the coil portion comprises a wound voice coil operatively attached to the top portion.

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8. A moveable assembly as in claim 5, wherein the coil portion comprises a coil configured on the surface of the top portion.

9. A moveable assembly as in claim 5, wherein the coil portion comprises a coil embedded in the top portion.

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10. A moveable assembly as in claim 1, wherein the top portion comprises:
a top plate for contacting at least a portion of an object such that vibratory motion may be imparted to the object; and
an element for contacting the coil portion.

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11. A moveable assembly as in claim 10, wherein the element for contacting the coil portion comprises at least one of the following for receiving the coil portion: a bobbin structure, a circuit board, the underside of the top plate.

12. A moveable assembly as in claim 1, wherein the bottom portion comprises:

- a base plate for contacting at least a portion of a fixed surface;
- a magnet for interacting with the coil portion in order to produce a vibrational force;
- at least one metallic pole piece for interacting with the magnetic field of the magnet.

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13. A moveable assembly as in claim 10, wherein the object is at least one of the following: an item of furniture, a moveable floor, a moveable platform.

14. A moveable assembly as in claim 12, wherein the fixed surface is a floor.

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15. A moveable assembly as in claim 12, wherein the metallic pole piece comprises:

- a bottom pole fixedly connected to the base plate;
- an outer pole configured about the magnet; and
- a top pole configured above the magnet, all poles being operative together to focus

15 the magnetic field of the magnet substantially through the coil portion.

16. A moveable assembly as in claim 1, wherein the bottom portion further comprises at least one pin fixedly connected to the base plate for receiving at least a portion of the spring assembly and for providing transverse support to the spring assembly.

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17. A moveable assembly as in claim 1, further comprising a bushing material attached to the moveable assembly for providing transverse support during vibratory motion.

18. A moveable assembly as in claim 2, wherein the spring assembly comprises at least one discrete spring located at the periphery of the electromagnetic assembly such that at least part of the spring is co-planar with at least part of the electromagnetic assembly.

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19. A moveable assembly as in claim 2, wherein the spring assembly comprises a material having springlike characteristics interspersed within the moveable assembly.

20. A moveable assembly as in claim 2, wherein the height of the spring assembly is substantially equal to the distance between the bottom portion and the top portion.

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21. A moveable assembly as in claim 18, wherein the spring assembly is made of an elastomeric material.

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22. A moveable assembly as in claim 1, further comprising integrated electrical connectors on an outer portion of the moveable assembly for facilitating electrical connection between a power source and the coil portion.

23. An electromagnetic apparatus for producing a vibratory motion in response to a signal from a power source, comprising:

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a bottom assembly comprising;

a base plate;

a magnet positioned on the base for producing a magnetic field; and

at least one pole piece for interacting with the magnet to modify a characteristic of the magnetic field;

a top assembly opposing the bottom assembly , said top assembly comprising;

a top plate; and

5 a coil portion for receiving the signal from the power source and interacting with the magnetic field and produce the vibratory motion; and

a spring assembly situated at least partially on the periphery of the bottom portion, and operative with the top portion and bottom portion to support the apparatus in the presence of a force.

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